



Food and Agriculture
Organization of the
United Nations

**GLOBAL SOIL
PARTNERSHIP**
13th Plenary Assembly
03-05 June 2025

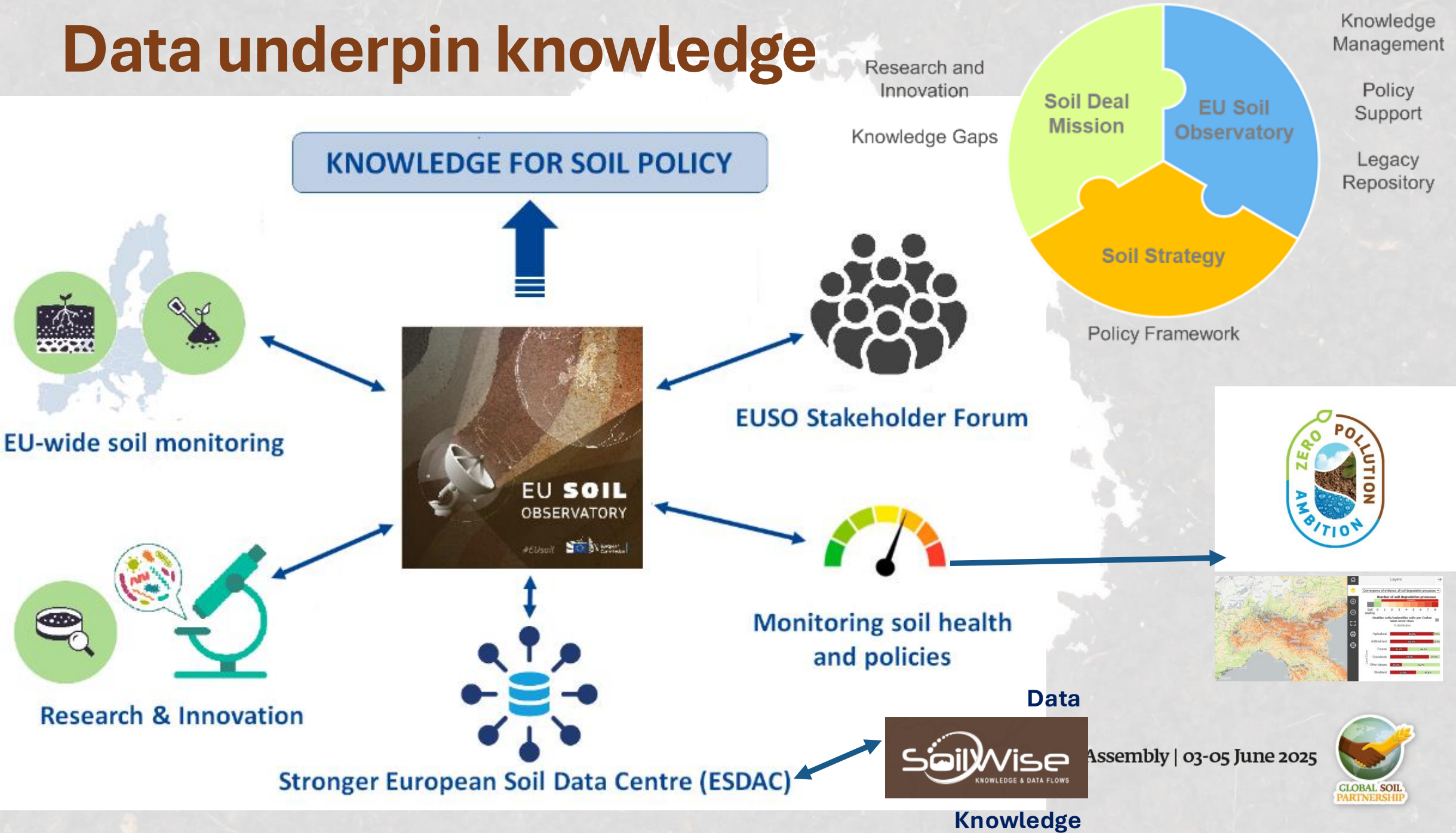
Reflections from the EU Soil Observatory on data and technology for assessing soil health



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European Commission
Joint Research Centre - EUSO



Data underpin knowledge



Lack of harmonized soil data in the EU

Early 2000s

JRC request Member States for data to develop a harmonized assessment on **soil organic carbon stocks** in the EU

2009

BUT

2012

Most Member States **no data**, or different **protocols** or **time** of sampling, ...

2015

2018

SO

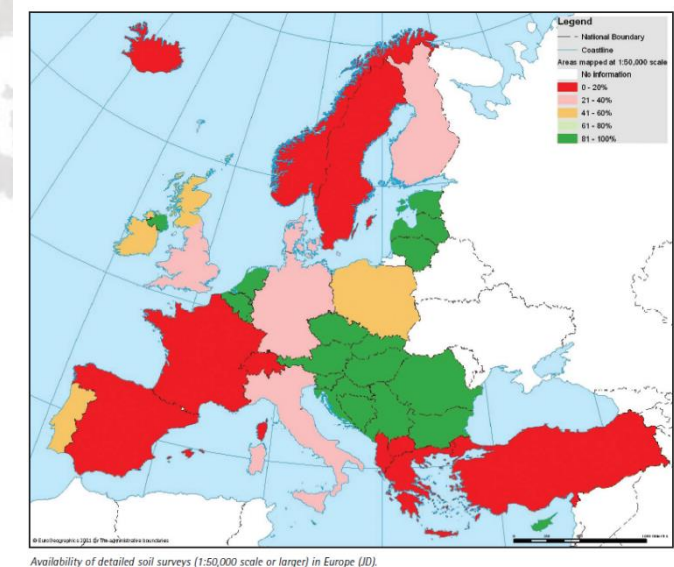
2022

2023

2025

Impossible to make EU-wide soil assessments

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Differences in soil surveys across EU member states
EC, Soil Atlas of Europe, 2005



LUCAS Soil – harmonized data



physical
chemical

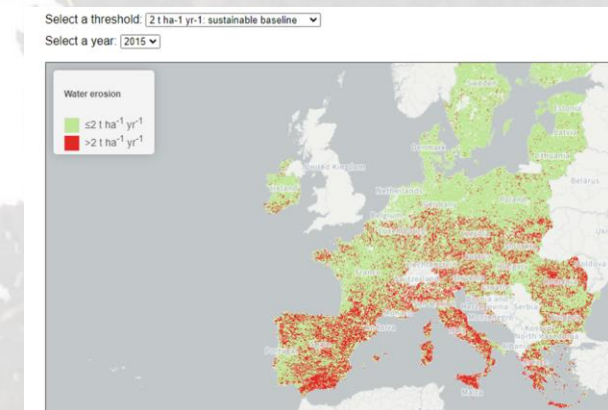
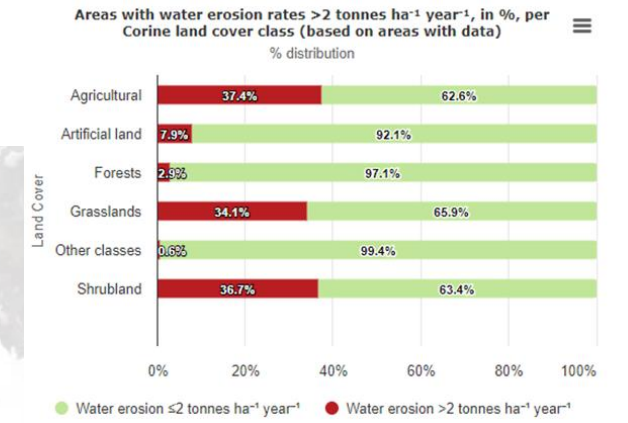
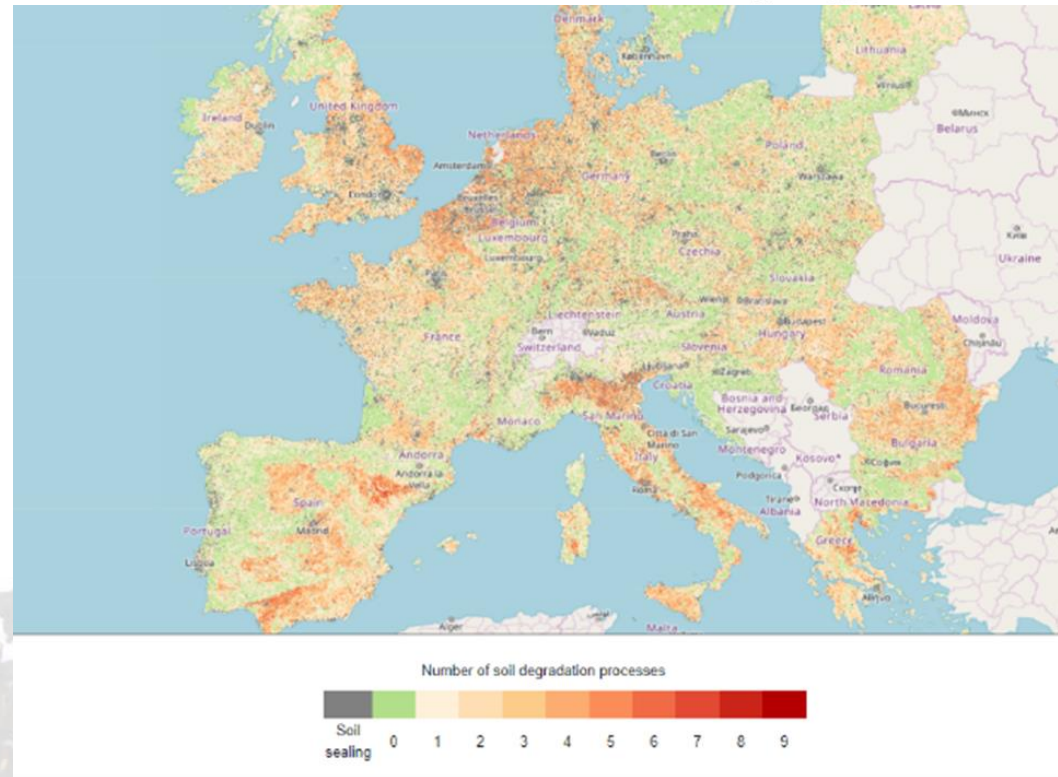
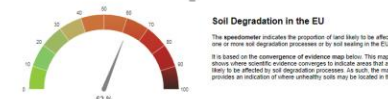
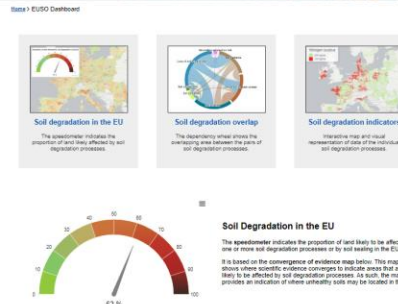
DNA



Soil property	Method (or equivalent)
Water content	ISO 11465:1993
Coarse fragments	ISO 11464:1994
Particle size distribution	ISO 11277:2020 / ISO 13320:2020
pH-H ₂ O, pH-KCl	ISO 10390:2020
Electrical conductivity	ISO 11265:1994
Soil organic carbon	ISO 10694:1995
Carbonate content	ISO 10693:1995
Phosphorus Olsen	ISO 11263:1994
Total nitrogen	ISO 11261:1995
Oxalate extractable iron, phosphorus, aluminium and arsenic	ISO 12782-3:2012
Cation exchange capacity	ISO 11260:2018
Aqua region digestion	ISO 11466: 1995
Extraction with 0.43 M HNO ₃ (Sb, As, Cd, Co, Cr, Cu, Hg, Ni, Pb, V, Zn)	ISO 17586:2016
Extraction of samples with diluted salt solution (Al, Sb, As, Cd, Ca, Co, Cr, Cu, Fe, Hg, Mg, Mn, Ni, Pb, P, K, Na, V, Zn)	ISO 11260:2018 or others (e.g. CaCl ₂)
VNIR-DRS	
DNA analyses	Orgiazzi et al., 2022
Presence of AMR Genes	Orgiazzi et al., 2022
Screening of plant protection products	
Quantitative analyses of plant protection products	

EU Soil Degradation Dashboard – building on data

- Build on EUSO Dashboard
- SML thresholds
- Integrate with other data (e.g. EO, Mission, etc.)



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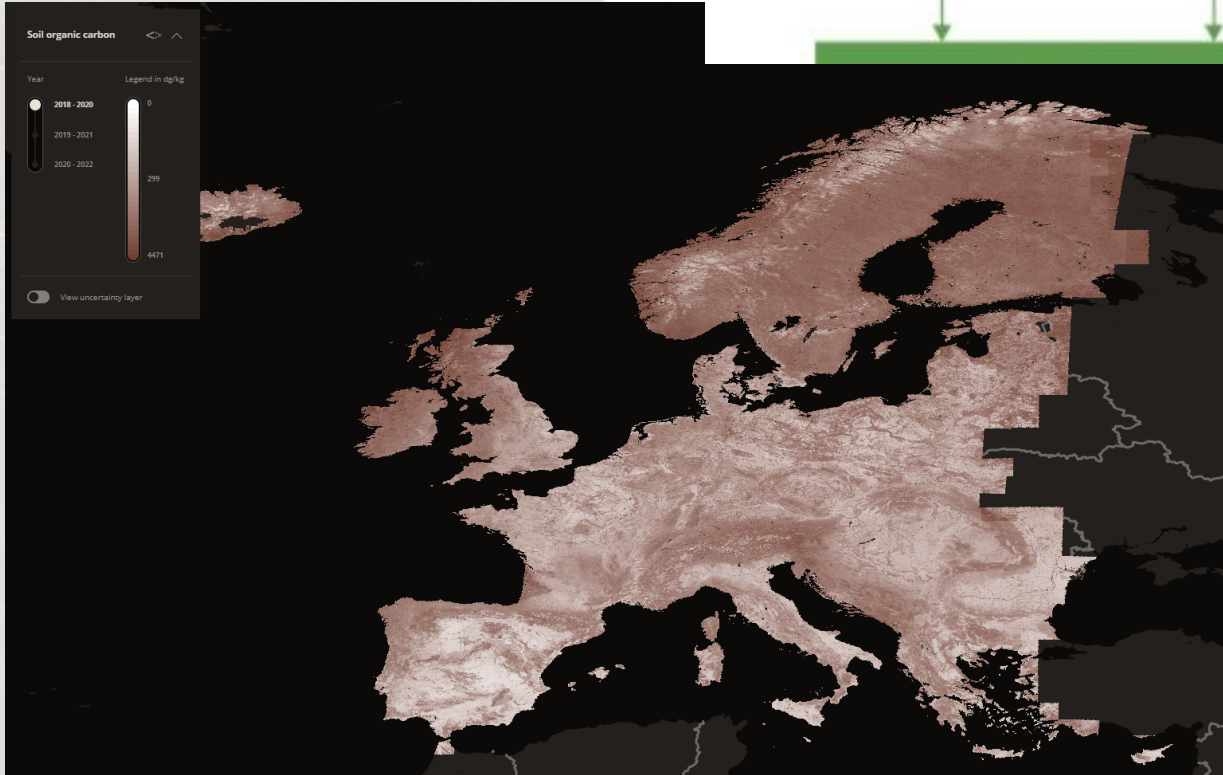
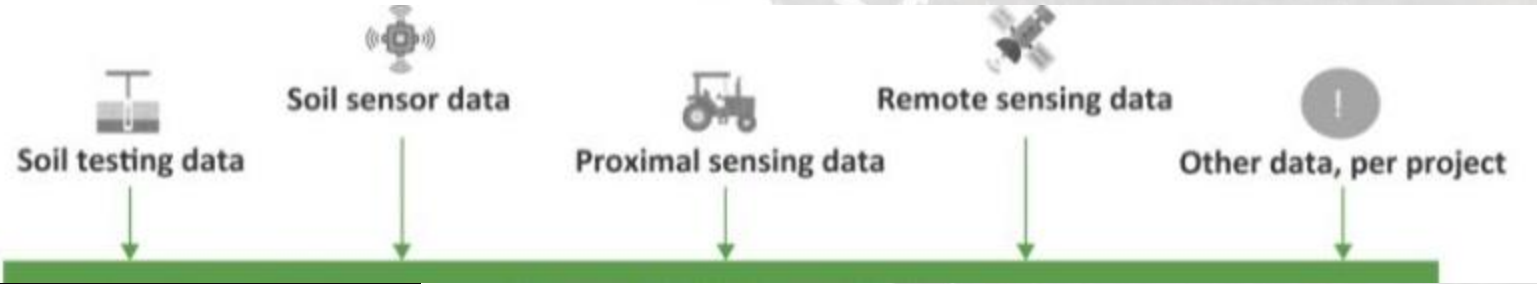
<https://esdac.jrc.ec.europa.eu/esdacviewer/euso-dashboard/>

Soil Monitoring Law

Directive on soil monitoring and resilience



Data sources and technologies

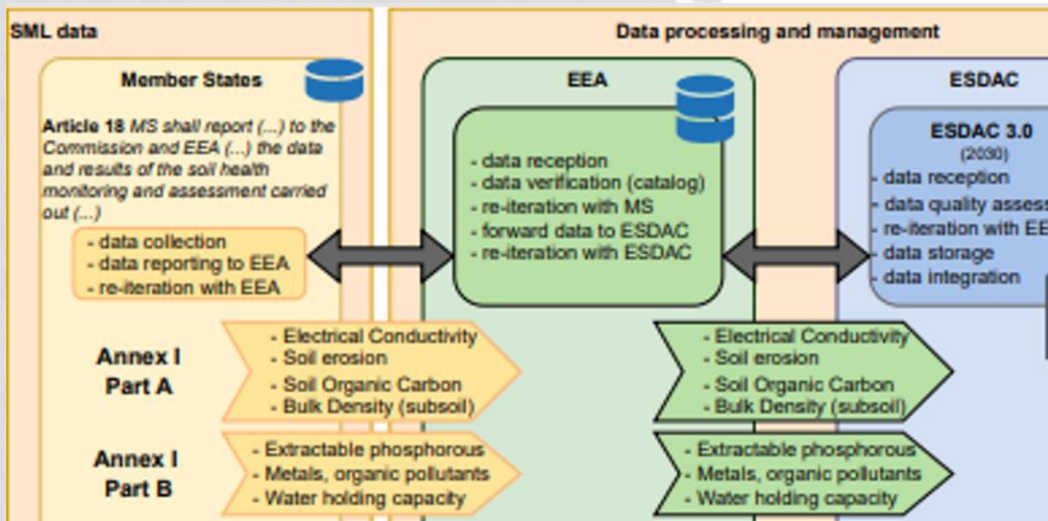


ESA WorldSols

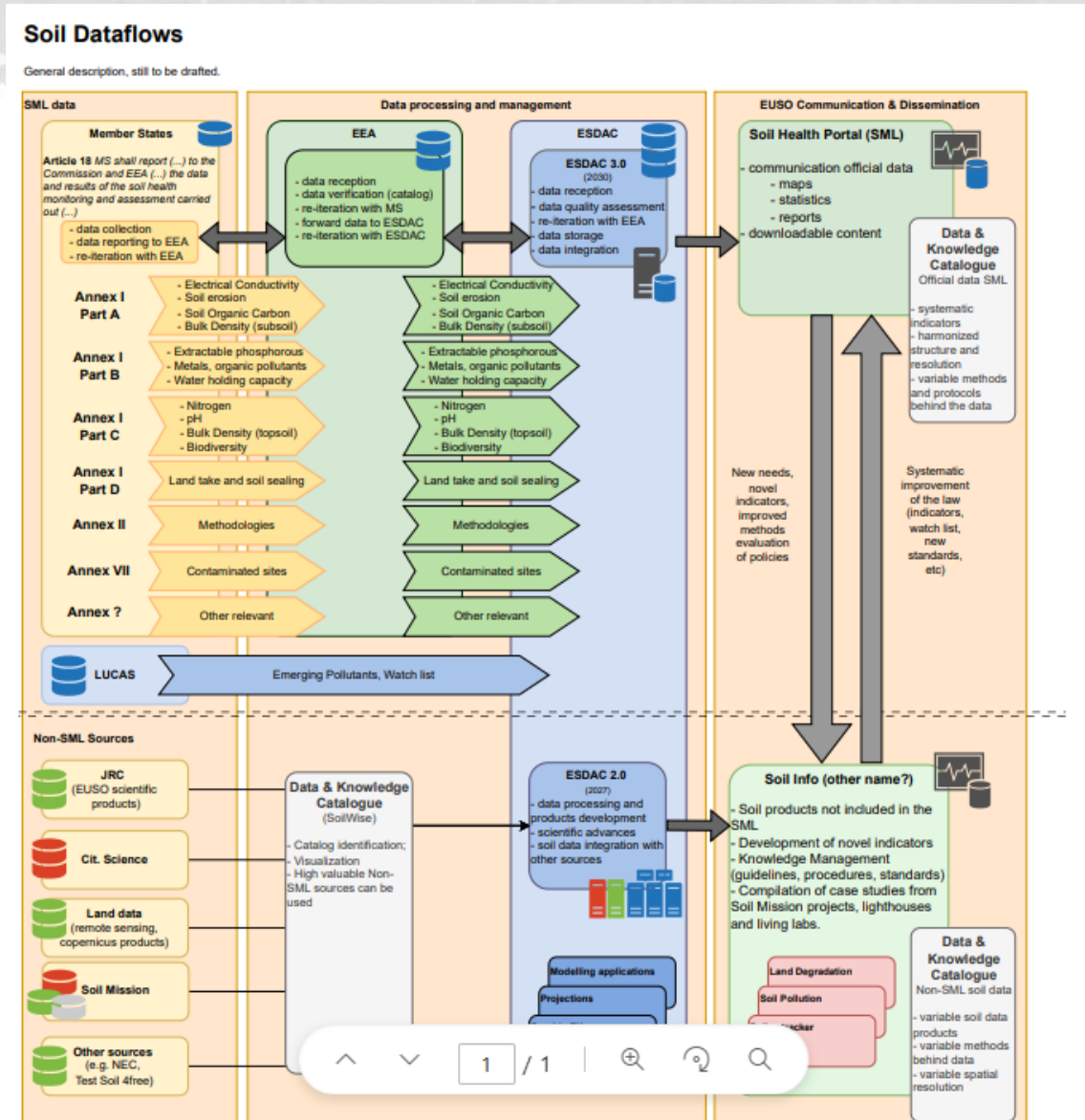
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Integrated data flows



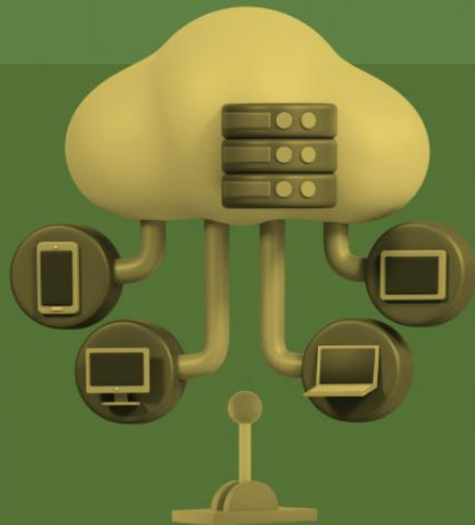
Transfer Functions
MS - LUCAS



EUSO Data & Knowledge Management



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Leveraging a Network of Soil R&I Knowledge and Data

Challenges & Objectives: Linking various soil research and knowledge repositories is crucial. This use case connects existing projects to SoilWise, promoting interoperability and minimizing duplication of effort.

User Case Leader: CIRAD



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THANK
YOU

